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(58) Field of search
C5C
Selected US specifications from IPC sub-class C11C

(54) Hydrogenation of palm stearine

(57) Palm stearine or a mixture of palm stearine and cow tallow is hydrogenated until the iodine value (IV) is in the range 1-5. The product may be used in making candles or match heads.

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Flow chart of producing wax from Palm Oil

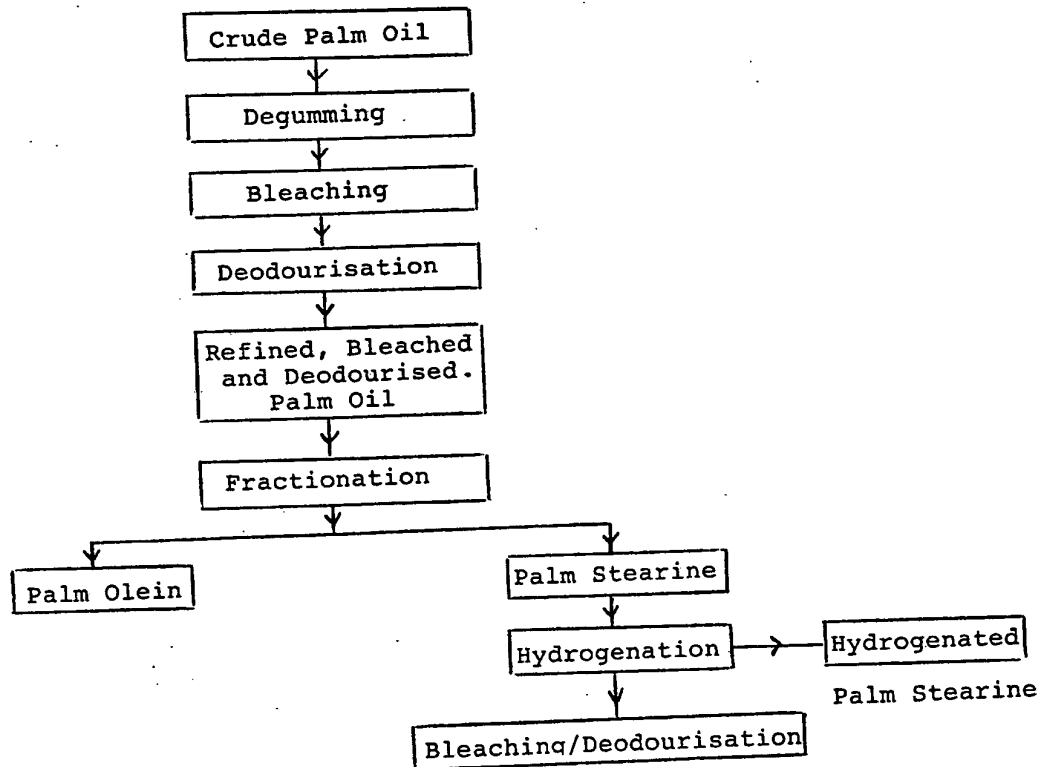


Fig. 1

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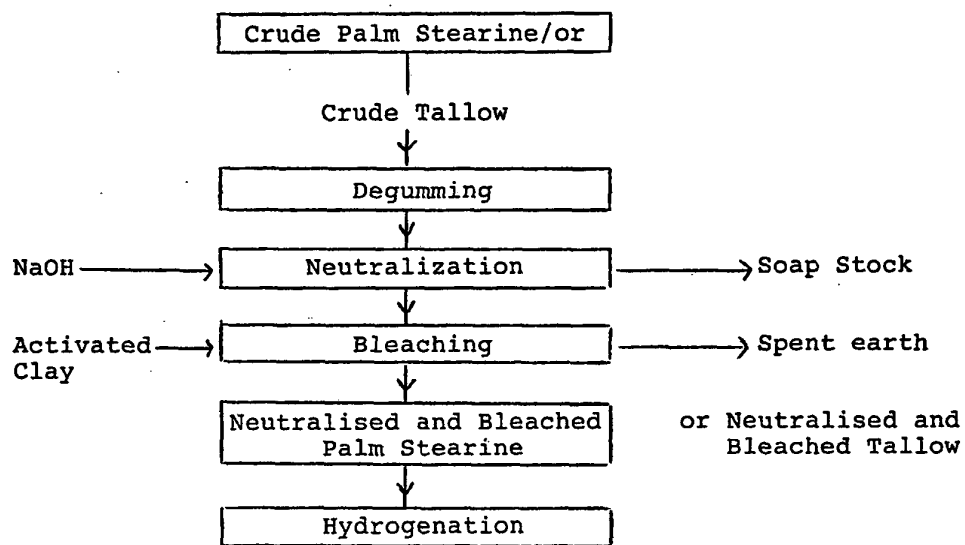


Fig. 2

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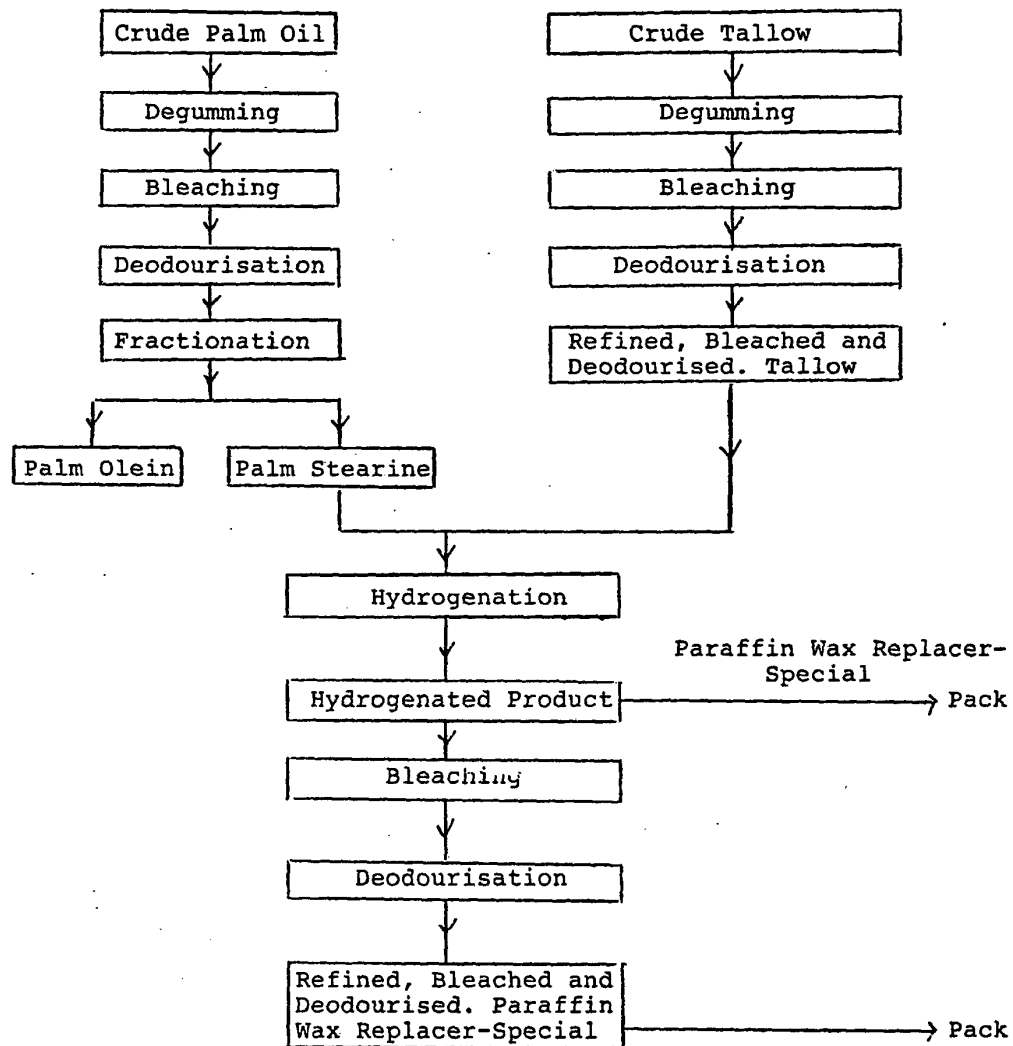


Fig. 3

SPECIFICATION

Waxes from palm oils (palm st arine)

- 5 This invention relates to producing wax from palm oil by hydrogenating palm stearine which is obtained from the thickened part of the palm oil until said palm oil is hard. It especially relates to producing wax from a mixture of palm oil and tallow (cow tallow) by mixing palm stearine with tallow then adding hydrogen until the mixture is homogeneous and hard at the desired melting point. This invention is useful for industrial uses either before or after deodourising, in the candles or matches industry and after deodourising, in the wax paper industry wherein it is used instead of petroleum oil. Wax from a mixture of palm oil and tallow is preferred because it is broken less and is less brittle than wax from palm oil only. 5
- 10 Palm stearine is a part of palm oil which is subjected to a fractionation process. There are two parts of the product, a transparent part is palm olein and a thickened part is palm stearine. Palm stearine is generally used in producing margarine, shortening, soap and animal food. The ratio of palm olein to palm stearine is about 65:35 parts. Because of commercial problems other products from wax are produced such as artificial wax for use in making candles, match heads, wax paper, etc. 10
- 15 Crude palm oil is subjected to degumming, bleaching, deodourisation and fractionation processes to produce palm stearine with the properties: 15
- 20 Iodine value (IV) =37-42
First melting point (MP) AOCS CC 3-25 =48-50
Melting point (MP) AOCS CC 1-25 =50-52 20
- 25 Though, in the case of palm stearine characteristics, the first melting point and melting point are rather high, they are not in accordance with the physiological properties whereby palm stearine is soft, is spreadable and is not rigid and so it is rather difficult to produce wax from the palm stearine. 25
- 30 The process for producing wax from palm stearine is hydrogenation of palm stearine comprising the following steps. 30
- 35 Palm stearine is melted by heating at about 60-70°C then pumped into a tank for addition of hydrogen, under a vacuum system and the vacuum is about 60 torr. Palm stearine is heated to 150°C and Ni Catalyst is added to the heated palm stearine in the ratio of 0.1-0.3% by weight, and hydrogen is introduced into the tank and during the reaction the temperature rises to about 170-180°C. The hydrogen addition at the pressure of hydrogen of about 20-140 psi (137.8-964.6 Kpa) is calculated on a theoretical basis. The product produced is evaluated periodically. When the reaction is stopped the iodine value from the analytical value is about 4. The hydrogen addition is then stopped and the temperature lowered using a water cooling system to a temperature of about 90°C. The hydrogenated palm stearine is filtered to remove Ni-catalyst. A comparison of non-hydrogenated palm stearine with the hydrogenated palm stearine is shown in Table 1 and a flow chart is shown in Fig. 1. 35
- 40 40

Table 1 Comparison of palm stearine before and after hydrogen addition.

5	Properties	before H ₂ adding	after H ₂ adding	5
10	Iodine Value	37 - 42	1 - 5	10
	mp	48 - 50	55 - 59	
15	AOCS CC 3 - 25			15
	mp	50 - 52	57 - 61	
	AOCS CC 1-25			
20	Fatty acid composition			20
	<u>BY GLC</u>			
	Lauric acid C ₁₂	0.3 - 0.5	0.3 - 0.5	
25	Myristic acid C ₁₄	1.2 - 1.4	1.2 - 1.5	25
	Palmitic acid C ₁₆	52 - 54	52 - 54	
	Stearic acid C ₁₈	3 - 5.00, 11	42 - 44	
30	Oleic acid C _{18.1}	31 - 33	-	30
	Linoleic acid C _{18.2}	8 - 10	-	
	Linolenic acid C _{18.3}	0.2 - 0.3	-	
35				35

The product is hydrogenated palm stearine which has a little odour. It is particularly useful for (1) mixing with paraffin wax to make candles and (2) being a component for making match heads. If the product is subject to deodourisation process it is useful for (3) coating wax paper to prevent water percolation.

The hydrogenated palm stearine produced is brittle and it can be used effectively by mixing it with hydrogenated tallow (cow tallow). It can be mixed from 10,20,30,40 to 50% and each percentage of added hydrogenated tallow will reduce the brittleness of palm stearine. The properties are shown in Table 2.

For mixing with hydrogenated tallow, crude palm oil is treated in the same manner as above to obtain hydrogenated palm stearine, and the tallow is treated in the same manner as above to obtain hydrogenated, refined, bleached and deodourised tallow. The hydrogenated tallow is then mixed with the hydrogenated palm stearine until the iodine value is 1-5 preferably 1-2. The mixing is stopped and the product is filtered and deodourised especially when the product is to be used as composition ingredient of material for use in contact with edible products such as wax paper.

Palm stearine and tallow may be subjected to a purification process by adding alkali (NaOH) before being subjected in hydrogenation process, as shown in Fig. 2. Fig. 3 shows a flow chart for producing wax from an oil mixture.

Table 2

Properties	Oil Mixture 1	Oil Mixture 2	Oil Mixture 3	Oil Mixture 4	Oil Mixture 5
Iodine Value	1-5	1-5	1-5	1-5	1-5
mp	55-62	55-62	55-62	55-62	55-62
(AOCs CC 3-25)					
mp	58-64	58-64	58-64	58-64	58-64
(AOCs CC 1-25)					
Fatty acid					
Composition					
by GLC					
Lauric acid C ₁₂	0.5-0.7	0.6-0.8	0.8-1.0	1.0-1.2	1.1-1.3
Myristic acid C ₁₄	1.5-1.7	1.6-1.9	2.0-2.2	2.1-2.4	2.4-2.6
Palmitic acid C ₁₆	50-51	46-49	44-47	42-44	40-42
Palmitoic acid C _{16.1}	tr	tr	tr	tr	tr
Stearic acid C ₁₈	44-46	46-48	48-50	50-52	51-54
Oleic acid C _{18.1}	tr	tr	tr	tr	tr

Properties of wax from several ratio of palm stearine and tallow	
Oil mixture 1	Palm stearine and tallow ratio 90:10 hydrogenated
Oil mixture 2	" 80:20 "
Oil mixture 3	" 70:30 "
Oil mixture 4	" 60:40 "
Oil mixture 5	" 50:50 "

CLAIMS

1. A process for producing wax from palm oil which comprises adding hydrogen to palm stearine until the iodine value is in the range 1-5.
- 5 2. A process for producing wax from palm oil which comprises adding hydrogen to a mixture 5 of palm stearine and tallow until the iodine value is in the range 1-5.
3. A process for producing wax from palm oil according to claim 1 or claim 2 substantially as hereinbefore described.
4. Wax whenever produced by the process according to any one of the preceding claims.

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